

REMARKS

This communication is responsive to the Office Action dated February 1, 2001. Claims 6 and 15 have been amended and new claims 21-24 have been added. Attached is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version With Markings To Show Changes Made**". Claims 6-24 (4 independent and 19 total claims) remain pending in this Application. Support for the amendments is found in the Specification and claims originally filed. No new matter is added by this Amendment.

Drawings

The Office objected to the drawings under 37 C.F.R. § 1.83(a) alleging that the ventilation holes must be shown in the drawings. Applicant refers to Figure 3 of the present application illustrating ventilation holes 366. Ventilation holes 366 are further described in the present application, *inter alia*, page 8, lines 11-21. Thus, Applicant respectfully requests withdrawal of this objection.

Specification

The Office indicated that the spacing of the lines of the Specification makes reading and entry of amendments difficult. Applicant submits that new application papers with lines double spaced on good quality paper were already submitted in the Response to Office Action filed November 9, 2000. In addition, a substitute abstract is enclosed with the lines in double-spaced format.

35 U.S.C. § 112 Rejections

Claim 8

The Office rejected claim 8 under 35 U.S.C. § 112 as containing subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention (i.e., the Specification is silent regarding the ventilation holes). Applicant respectfully traverses this rejection.

Indeed, the Specification is not silent regarding the ventilation holes. On page 8, lines 11-21 of the present application, for example, ventilation holes 366 are discussed in connection

with Figure 3. Further, on page 14, lines 6-9 of the present application, ventilation holes 366 are again discussed. Applicant submits that the description of ventilation holes 366 in the present application is described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Thus, Applicant respectfully requests withdrawal of this rejection.

Claims 6-14

The Office rejected claims 6-14 under 35 U.S.C. § 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully traverses this rejection.

Figures 3 clearly illustrates "a faceplate coupled to each of said first and second circuit boards" as recited in claim 6 (and claims 7-14 which variously depend from claim 6). Figure 3 illustrates printed circuit boards 314 and 315 coupled to face plate 313. Thus, Applicant respectfully requests withdrawal of this rejection.

35 U.S.C. § 102 Rejections

The Office rejected claims 6, 7, 15, and 18-20 under 35 U.S.C. § 102(b) as being anticipated by Craker, U.S. Patent No. 4, 716, 497, issued December 29, 1987 ("Craker"). Applicant respectfully traverses this rejection.

Craker discloses a printed circuit board module 10 having a first printed circuit board 12, a frame 14 parallel to the printed circuit board 12, and a front faceplate panel 22. The frame 14 consists of a central connecting member 16 and two legs 18 and 20 to form a C-shaped frame. The panel 22 of the module is fastened to the ends of the frame legs 18 and 20 and the first printed circuit board 12. A second printed circuit board 28 may be electrically connected to the first printed circuit board 12 via a ribbon cable. The second printed circuit board 28 is fastened to the underside of a frame insert 26 (where the frame insert 26 is held with the central opening of frame 14). Craker also briefly mentions U.S. Patent No. 4,302,820, which discloses a rack into which a number of printed circuit board assemblies plug. The rack in U.S. Patent No. 4,302,820 has a backplane printed circuit board having a series of connectors, which mate with connectors on each printed circuit board. In addition, Craker discloses a channel extending longitudinally along the edges of the frame 14, where the width of the channel on the interior edge of the frame 14 is to permit the insert 26 to slide along the channel.

Claims 6 and 7

However, Craker fails to disclose "a connector assembly coupled to each of said first and second circuit boards opposite said faceplate" as recited in claim 6 (and claim 7 which depends from claim 6). To the extent this rejection applies to new claims 21 and 22, Craker also fails to disclose "a plurality of circuit integration modules for insertion into the avionics cabinet, wherein each circuit integration module includes at least one circuit board coupled between a faceplate and a connector assembly" as recited in claim 21 (and claim 22 which depends from claim 21) and claim 23 (and claim 24 which depends from claim 23). Rather, Craker discloses panel 22 fastened to the first printed circuit board 12 only; whereas, the second printed circuit board 28 is fastened to the underside of the frame insert 26. Further, although Craker discloses printed circuit board module 10, it fails to disclose a circuit integration module (and a plurality of such circuit integration modules) as recited in new claims 21-24.

In addition, Craker fails to disclose "wherein said connector assembly is configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet" as recited in claim 6 (and claim 7 which depends from claim 6). U.S. Patent No. 4,302,820 discloses a rack having a backplane printed circuit board having a series of connectors, however, it fails to disclose the connector assembly of the claimed invention. Further, although the rear edge 13 of the printed circuit board 12 of Craker has electrical connectors to couple with a chassis into which module 10 may be placed, Craker fails to disclose a connector assembly "configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet" as recited in claim 6 (emphasis added). In support of this distinction, the second printed circuit board 28 is "electrically connected" to the first printed circuit board 12. However, the electrical connectors are only "coupled" with the chassis in Craker, and as such do not provide a direct electrical interface as recited in claim 6.

Furthermore, no where does Craker disclose "integrating and allocating signals between said first and second circuit boards and said avionics cabinet" as recited in claim 6 (emphasis added). To the extent this rejection applies to claims 21 and 22, Craker also fails to disclose where "said connector assembly is configured to integrate and allocate signals between said plurality of circuit integration modules" as recited in claim 21, and "wherein said connector assembly is configured to integrate and allocate signals between said plurality of circuit

integration modules and said avionics cabinet" as recited in claim 22. Also, to the extent this rejection applies to claims 23 and 24, Craker fails to disclose "integrating and allocating signals between said plurality of circuit integration modules via said connector assembly" as recited in claim 23 and "integrating and allocating signals between said plurality of circuit integration modules and said avionics cabinet via said connector assembly" as recited in claim 24. As such, no where does Craker teach integrating and allocating signals. Although the electrical connectors are "coupled" with the chassis in Craker, it fails to teach the integration and allocation of signals between the circuit integration modules themselves and between the circuit integration modules and the avionics cabinet.

Craker also fails to disclose "spacers separating said first and second circuit boards such that a gap between said first and second circuit boards is formed" as recited in claim 7. Craker discloses the first printed circuit board assembly spaced from and parallel to the printed circuit board frame, but no spacers are disclosed. Accordingly, no spacers are mounted between printed circuit boards 12 and 28 as alleged by the Office. Applicant respectfully requests clarification by the Office as to which element(s) in Craker are the alleged spacers. Thus, Applicant respectfully requests withdrawal of this rejection.

Thus, Craker fails to disclose one or more of the claimed elements, so that claims 6 and 7 are not anticipated by Craker. To the extent applicable, claims 21-24 are also not anticipated by Craker.

Claims 15 and 18-20

However, Craker fails to disclose "securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet" as recited in claim 15 (and claims 18-20 which variously depend from claim 15) (emphasis added). As discussed above in connection with claim 6, Craker fails to disclose "a direct electrical interface between said module and said avionics cabinet" as recited in claim 15.

In addition, Craker fails to disclose "aligning said module to a guide on said avionics cabinet" as recited in claim 15 (and claims 18-20 which variously depend from claim 15). Rather, Craker discloses a channel extending longitudinally along the edges of the frame 14 to permit the insert 26 to slide along the channel. In this manner, the channel in Craker is on the frame 14, instead of "a guide on said avionics cabinet" as recited in claim 15. Thus, the channel in Craker is on the frame 14 and not on the chassis (e.g., avionics cabinet).

Further, Craker fails to disclose where "said screw is a jack screw" as recited in claim 20. Although Craker teaches a mounting bolt 60 to attach front face plate 22 to a cabinet, it does not teach that the mounting bolt is a jack screw. While the bolt 60 holds the face plate 22 to the electronics cabinet, it also functions as an electrical connection providing power to digital displays on the face plate. As shown in figure 4, the mounting bolt passes through a compression spring 76 and ground strap 68 to provide an "electrical connection" "to both the printed circuit board and the frame". Col. 4, lines 56-59. Craker also teaches that the mounting bolt "is fastened to the printed circuit board enclosure to hold the module in the enclosure". Col. 4, lines 55, 56. In other words, the mounting bolt is pulling the module to the chassis and providing an electrical connection. In contrast, a "jack screw" is a mechanical device, where a screw applies a certain amount of force to lift or push a load. Accordingly, Craker does not teach that the mounting bolt is a jack screw or that any amount of force is applied by the screw to clutch or hold the module to the chassis.

Thus, Craker fails to disclose one or more of the claimed elements, so that claims 6, 7, 15, and 18-20 are not anticipated by Craker.

35 U.S.C. § 103 Rejections

Applicant respectfully believes that the § 103 rejections contained within the Office Action are now moot, since they apply to claims that depend from allowable independent claims, and are therefore patentable *a fortiori*. Nevertheless, Applicant further distinguishes the references as follows:

Claim 8

The Office rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Craker in view of Davies et al., U.S. Patent No. 4,736,274, issued April 5, 1988 ("Davies"). Applicant respectfully traverses this rejection.

Davies discloses an upper input-plenum means (P1, P2, P3) for receiving input coolant air (AIR IN) and urging the air down through a set of printed circuit cards to finally exit the rack and the machine (AIR OUT). Figure 1 and col. 1, line 15 to col. 2, line 7.

As discussed above, Craker fails to disclose the claimed invention as recited in claim 6 (and claim 8 which depends from claim 6). In addition, Davies fails to teach, advise, or suggest "said gaps are configured to align with ventilation holes in said avionics cabinet" as recited in

claim 8. Rather, Davies merely teaches the plenum means discussed above, and not gaps "configured to align with ventilation holes in said avionics cabinet" as recited in claim 8. In this manner, Craker in view of Davies fails to teach, advise, or suggest the claimed invention as recited in claim 8. Thus, claim 8 would not have been obvious over Craker in view of Davies.

Claims 9-12 and 16-17

The Office rejected claims 9-12 and 16-17 under 35 U.S.C. § 103(a) as being unpatentable over Craker in view of McKenzie, U.S. Patent No. 4,002,386, issued January 11, 1977 ("McKenzie"). Applicant respectfully traverses this rejection.

The McKenzie reference discloses a handle, which locks in place to prevent it from pinching fingers against the printed circuit boards since there is no face plate covering the PCB. As part of the locking mechanism, a plurality of pulling pins are disclosed that interact with slots in the handle to keep it in a locked position. Upon careful examination of the cited figures and the accompanying text at McKenzie, col. 2, lines 39-47, it is apparent that the handle is not retractable, but rather is attached to pins mounted in the printed circuit board. Slots in the handle move the handle over a pin to a keyhole 50/51 in the slot, which then locks the handle in position. As such, McKenzie teaches a handle arrangement that requires pins to be mounted directly on to the printed circuit board and handle ends, which lock the handle in position. Indeed, the McKenzie reference teaches away from the claimed invention in that the handle in McKenzie is made to lock into position. In addition, modifying the handle in McKenzie to include the missing claimed elements would render McKenzie improper for its intended purpose, namely to lock the handle in position. Consequently, even a combination of Craker in view of McKenzie fails to teach, advise, or suggest the claimed invention as recited in claims 9 and 10.

Furthermore, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Craker and McKenzie to include the missing claimed elements. Regardless, Craker in

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view of McKenzie fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 9-12 and 16-17 are patentable over Craker in view of McKenzie.

Claims 13 and 14

The Office rejected claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Craker in view of Tollbom, U.S. Patent No. 5,793,614, issued August 11, 1998 ("Tollbom"). Applicant respectfully traverses this rejection.

Tollbom discloses an injector/ejector for an electronic module housing. A modular electronic system 10 has a chassis 12 and a removable module 14. The module 14 slides into and out of the chassis 12 along a slide axis 30. The module 14 has upper and lower fins 49, which slide within grooved guides 51 mounted on the upper and lower surfaces of a chassis chamber 50 of chassis 12.

However, Tollbom fails to teach, advise, or suggest "a first groove configured to interface with a first guide rail on said avionics cabinet" as recited in claim 13 or "a second groove configured to interface with a second guide rail on said avionics cabinet" as recited in claim 14. Rather, Tollbom discloses upper and lower fins 49 on the module 14, and not a groove configured to interface with a "guide rail on said avionics cabinet" as recited in claims 13 and 14.

In addition, the grooved guides 51 are mounted on chassis chamber 50 of chassis 12, and as such are not part of the module 14. The first and second grooves as recited in claims 13 and 14, respectively, are part of the module. Thus, Tollbom fails to teach, advise, or suggest the first and second grooves as recited in claims 13 and 14.

Further, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Craker and Tollbom to include the missing claimed elements. Regardless, Craker in view of Tollbom fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 13 and 14 are patentable over Craker in view of Tollbom.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that all of the pending claims are allowable over the prior art of record. Reconsideration of the application and allowance of all pending claims is earnestly solicited. Should the Examiner wish to discuss any of the above in greater detail, then the Examiner is invited to telephone the undersigned at the Examiner's convenience.

Dated this 5th day of July, 2001.

Respectfully submitted,

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As described above, with reference to Figures 3 and 4, the front 305 of the chassis 302 suitably includes the slots 303 for receiving the PCB modules 312. In the present exemplary embodiment, the front 305 of the chassis 302 preferably includes an upper horizontal beam 308 and a lower horizontal beam 336 configured with slots to receive a plurality of vertical beams 310. The upper and lower horizontal beams 308 and 336 are suitably configured with positioning pins 356 and 360 to initially position the vertical beams 310 within the slots formed in the upper and lower horizontal beams 308 and 336. The vertical beams 310 are then bolted through [bolt holes 35] bolt holes 354 and 358 formed in the vertical beams 310 and upper and lower horizontal beams 308 and 336. With particular reference to Figure 4, the upper horizontal beam 308 is suitably attached to the top panel 304 with bolts 410. Similarly, the lower horizontal beam 336 is suitably attached to the bottom panel 340. It should be recognized, however, that the slots 303 for receiving the PCB modules 312 can be formed using any convenient method. For example, rather than using the horizontal and vertical beams 308, 336 and 310, the front 305 can be formed as a single piece.

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ABSTRACT OF THE DISCLOSURE

An electronics cabinet is described as being suitable for use in an aircraft. Various embodiments of the cabinet include a databus that facilitates data communications between circuit boards inserted into the cabinet. The cabinet also preferably includes access holes that allow inserted circuit boards to connect directly to an aircraft wiring harness.

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6. (AMENDED) A circuit integration module for insertion into an avionics cabinet, said module comprising:
- first and second circuit boards;
 - a faceplate coupled to each of said first and second circuit boards; and
 - a connector assembly coupled to each of said first and second circuit boards opposite said faceplate, wherein said connector assembly is configured to provide [an] a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet.
15. (AMENDED) A method of inserting a circuit integration module into an avionics cabinet, the method comprising the steps of:
- aligning said module to a guide on said avionics cabinet;
 - inserting said module into said avionics cabinet along said guides; and
 - securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet [such that said module is retained in said cabinet].